AMENDMENTS TO THE CLAIMS:

This listing of claims replaces all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (Currently Amended) A method of operating an electrochemical fuel cell stack comprising a plurality of fuel cells, each of the fuel cells comprising ~~having~~ an anode, an ion transfer membrane, and a cathode, the method comprising:

delivering fluid fuel to one or more fluid flow channels ~~within the~~ in each anode of one or more fuel cells in the electrochemical fuel cell stack;

delivering fluid oxidant to one or more fluid flow channels ~~within the~~ in each cathode of the one or more fuel cells;

exhausting reaction by-products and unused oxidant from the one or more fluid flow channels in each ~~within the~~ cathode of the one or more fuel cells; and

delivering a sufficient quantity of liquid water to the one or more fluid flow channels in each ~~within the~~ cathode of the one or more fuel cells such that a relative humidity of 100% is maintained ~~substantially~~ throughout the one or more fluid flow channels in each cathode of the one or more fuel cells;

wherein delivering the sufficient quantity of liquid water comprises:

determining, for each of a plurality of currents, a maximum voltage for the one or more fuel cells as a function of liquid water flow rate, the each of a plurality of currents being within a normal range of operating conditions of the one or more fuel cells;

determining a calibration function expressing a minimum liquid water flow rate as a function of current and/or air stoichiometry, the minimum liquid water flow rate being based on a corresponding maximum voltage; and

delivering at least the minimum liquid water flow rate for a corresponding current drawn from the one or more fuel cells and/or for the air stoichiometry, the delivered minimum liquid water flow rate being determined by the calibration function.

2. (Currently Amended) The method of claim 1, wherein ~~delivering a sufficient quantity of liquid water comprises: determining a maximum fuel cell voltage as a function of liquid water flow rate; and delivering at least a minimum water flow rate corresponding to the maximum~~ the one or more fuel cells comprises less than all fuel cells in the electrochemical fuel cell stack ~~voltage~~.

3. (Currently Amended) The method of claim 1, ~~which is performed on a plurality of electrochemical~~ wherein the one or more fuel cells ~~in a~~ comprises all fuel cells in the electrochemical fuel cell stack~~;~~

~~wherein delivering a sufficient quantity of liquid water comprises:~~

~~determining a maximum stack voltage as a function of liquid water flow rate; and~~

~~delivering at least a minimum water flow rate corresponding to the maximum stack voltage~~.

4. (Currently Amended) The method of claim 1, further comprising:

increasing ~~the~~ a quantity of liquid water delivered to one or more fluid flow channels of each cathode of the one or more fuel cells as a function of fuel cell current in order to maintain a water factor greater than ~~WF >~~ 1.0 for all currents within a normal operating range of the one or more fuel cells ~~fuel cell~~.

5 and 6. (Canceled)

7. (Currently Amended) The method of claim 1 ~~5~~, wherein the calibration function is determined for air stoichiometry in a range 1.1 to 10.

8. (Currently Amended) The method of claim 1 ~~7~~, wherein the calibration function is determined for air stoichiometry in a range 1.4 to 4.0.

9. (Currently Amended) The method of claim 1, wherein delivering ~~a~~ the sufficient quantity of liquid water comprises delivery of a water factor of at least 1.5.

10. (Currently Amended) The method of claim 1 ~~9~~, wherein delivering ~~a~~ the sufficient quantity of liquid water comprises delivery of a water factor of at least 3.

11. (Currently Amended) The method of claim 1 ~~9~~, wherein delivering ~~a~~ the sufficient quantity of liquid water comprises delivery of a water factor of less than 40.

12. (Currently Amended) The method of claim 1 ~~11~~, wherein delivering ~~a~~ the sufficient quantity of liquid water comprises delivery of a water factor in the range from 3 to 6.

13. (Currently Amended) The method of claim 1 further comprising:

temporarily permitting delivery of a quantity of liquid water to ~~the~~ one or more fluid flow channels ~~within the~~ of a cathode of the one or more fuel cells such that a relative humidity of less than 100% is maintained when an exhaust temperature of the cathode is below a predetermined threshold corresponding to a sub-optimal operating temperature.

14. (Previously Presented) The method of claim 13, which is applied upon start-up of the fuel cell.

15. (Currently Amended) The method of claim 1, wherein ~~the~~ a fuel cell among the one or more fuel cells is operated such that, for any measured fuel cell power delivery, a liquid water injection rate into ~~the~~ a cathode of the fuel cell and/or gas flow through the cathode are controlled to ensure that there is more liquid water in all regions of a ~~cathode~~ surface of the cathode than can be evaporated in prevailing temperature and pressure conditions.

16. (Currently Amended) The method of claim 15, which is performed on a plurality of ~~electrochemical~~ fuel cells in ~~a~~ the electrochemical fuel cell stack having a common oxidant supply manifold and a common water injection manifold such that, for any measured stack power delivery, liquid water injection rate into the common water injection manifold and/or gas flow rate in the common oxidant supply manifold are controlled to ensure that there is more liquid water in all regions of cathode surfaces of all of the plurality of fuel cells than can be evaporated in prevailing temperature and pressure conditions.

17. (Currently Amended) An electrochemical fuel cell assembly comprising:

an electrochemical fuel cell stack comprising a plurality of fuel cells, each of the fuel cells comprising:

~~at least one~~ an anode fluid flow field plate having one or more anode fluid flow channels therein;

~~at least one~~ an ion transfer membrane; and

~~at least one~~ a cathode fluid flow field plate having one or more cathode fluid flow channels therein;

a mechanism for delivering fluid fuel to ~~the~~ one or more anode fluid flow channels of one or more fuel cells in the electrochemical fuel cell stack;

a mechanism for delivering fluid oxidant to ~~the~~ one or more cathode fluid flow channels of the one or more fuel cells; and

a water injection mechanism for delivering a sufficient quantity of liquid water to the one or more cathode fluid flow channels ~~within the cathode~~ such that a relative humidity of 100% is maintained ~~substantially~~ throughout the one or more cathode fluid flow channels during normal operating conditions of the one or more fuel cells ~~cell~~;

wherein delivering the sufficient quantity of liquid water comprises:

determining, for each of a plurality of currents, a maximum voltage for the one or more fuel cells as a function of liquid water flow rate, the each of a plurality of currents being within a normal range of operating conditions of the one or more fuel cells;

determining a calibration function expressing a minimum liquid water flow rate as a function of current and/or air stoichiometry, the minimum liquid water flow rate being based on a corresponding maximum voltage; and

delivering at least the minimum liquid water flow rate for a corresponding current drawn from the one or more fuel cells and/or for the air stoichiometry, the delivered minimum liquid water flow rate being determined by the calibration function.

18. (Previously Presented) The assembly of claim 17, wherein the water injection mechanism comprises a pump and a controller.

19. (Previously Presented) The assembly of claim 18, wherein the controller comprises a voltage sensor for sensing a fuel cell voltage.

20. (Currently Amended) The assembly of claim 19, wherein the controller is configured to operate in a calibration mode comprising determining, for each of the plurality of currents, the maximum voltage for the one or more fuel cells as a function of liquid water flow rate ~~a maximum cell voltage as a function of liquid water flow rate for each of a plurality of normal fuel cell or fuel cell stack operating currents~~.

21. (Currently Amended) The assembly of claim 20, wherein the calibration mode further comprises determining the calibration function expressing the minimum liquid water flow rate as a function of current and/or air stoichiometry ~~a calibration function expressing a minimum liquid water flow rate as a function of current and air stoichiometry~~.

22. (Currently Amended) The assembly of claim 18, further comprising:

a current sensor for sensing current flow through the one or more fuel cells in the electrochemical ~~fuel cell or through a~~ fuel cell stack;

wherein the controller is configured to control a water injection rate to maintain delivery of a water factor ~~WF >~~ greater than 1.0 for all ~~fuel cell or fuel cell stack~~ currents within a normal operating range of the one or more fuel cells.

23. (Previously Presented) The assembly of claim 22, wherein the controller is configured to control the water injection rate to maintain delivery of a water factor of at least 1.5.

24. (Currently Amended) The assembly of claim 22 ~~23~~, wherein the controller is configured to control the water injection rate to maintain delivery of a water factor of less than 40.

25. (Currently Amended) The assembly of claim 22 ~~24~~, wherein the controller is configured to control the water injection rate to maintain delivery of a water factor of at least 3.

26. (Previously Presented) The assembly of claim 18, wherein the controller is configured to control the water injection rate to maintain of delivery of a water factor in a range from 3 to 6.

27. (Currently Amended) The assembly of claim 17, further comprising:

a mechanism for temporarily permitting delivery of a quantity of liquid water to the one or more cathode fluid flow channels ~~within the cathode~~ such that a relative humidity of less than 100% is maintained when ~~a cathode~~ an exhaust temperature of a cathode of the one or more fuel cells is below a predetermined threshold corresponding to a sub-optimal operating temperature.

28 and 29. (Canceled)